

A comprehensive health service evaluation and monitoring framework



Carole Reeve^{a,b,*}, John Humphreys^c, John Wakerman^a

^a Centre for Remote Health, Flinders University & Charles Darwin University, PO Box 4066, Alice Springs 0871, NT, Australia

^b Western Australian Country Health Services, Kimberley Population Health Unit, Locked Bag 4011, Broome 6725, WA, Australia

^c Centre of Research Excellence in Rural and Remote Primary Care, Monash University School of Rural Health, Bendigo 3552, VIC, Australia

ARTICLE INFO

Article history:

Received 19 November 2014

Received in revised form 17 August 2015

Accepted 25 August 2015

Available online 28 August 2015

Keywords:

Primary health care

Rural and remote

Indigenous

Performance

Sustainability

Community

ABSTRACT

Objective: To develop a framework for evaluating and monitoring a primary health care service, integrating hospital and community services.

Method: A targeted literature review of primary health service evaluation frameworks was performed to inform the development of the framework specifically for remote communities. Key principles underlying primary health care evaluation were determined and sentinel indicators developed to operationalise the evaluation framework. This framework was then validated with key stakeholders.

Results: The framework includes Donabedian's three seminal domains of structure, process and outcomes to determine health service performance. These in turn are dependent on sustainability, quality of patient care and the determinants of health to provide a comprehensive health service evaluation framework. The principles underpinning primary health service evaluation were pertinent to health services in remote contexts. Sentinel indicators were developed to fit the demographic characteristics and health needs of the population. Consultation with key stakeholders confirmed that the evaluation framework was applicable.

Conclusion: Data collected routinely by health services can be used to operationalise the proposed health service evaluation framework. Use of an evaluation framework which links policy and health service performance to health outcomes will assist health services to improve performance as part of a continuous quality improvement cycle.

© 2015 The Authors. Published by Elsevier Ltd. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

1. Introduction

Rural and remote communities in Australia are characterised by poorer health outcomes compared with urban areas, this is at least in part due to the large proportion of Aboriginal and Torres Strait Islander people living outside of urban areas ([Australian Institute of Health and Welfare, 2012](#)). Remote areas of Australia are disproportionately populated by Aboriginal and Torres Strait Islander people, Census data in 2011 showed that almost half (45%) of all people in very remote areas and 16% in remote areas were Aboriginal and Torres Strait Islander people compared with 3% Aboriginal and Torres Strait Islander people in the total population ([ABS, 2013a](#)). Rural and remote Aboriginal populations experience health inequities compared to the rest of Australians ([AIHW, 2010](#)). The gap in the health of Aboriginal and Torres Strait

Islander people and non-Indigenous Australians is illustrated by differences in life expectancy. Life expectancy at birth for Aboriginal and Torres Strait Islander people in 2010–2012 was 73.7 years for females and 69.1 years for males, compared with 83.1 and 79.7 years for non-Indigenous females and males respectively ([ABS, 2013b](#)). The challenge of how to improve these health outcomes is considerable, particularly in remote Aboriginal communities with decreased access to services and socioeconomic disadvantage.

Integral to improving rural and remote health outcomes is the provision of appropriate, accessible and effective health care services relevant to the needs of communities. This requires a mechanism to monitor and evaluate the impact of health services on improving health outcomes for communities. However, there is a paucity of rigorous studies showing the relationship between models of health care in remote areas and health outcomes ([Rowley, O'Dea, & Anderson, 2008](#)). The literature on primary health service evaluation linkages to improvements in health outcomes in remote Aboriginal communities has been limited ([Bailie, Si, O'Donoghue, & Dowden 2007](#)) until relatively recently when there have been important and insightful publications

* Corresponding author at: Flinders University & Charles Darwin University, A Centre for Remote Health, Skinner St, Alice Springs 0870, NT, Australia.

Tel.: +61 8 8951 4795/+610428043219; fax: +61 8 8951 4777.

E-mail address: carole.reeve@flinders.edu.au (C. Reeve).

covering Quality Improvement (QI) work focussed on outputs and clinical outcomes addressing this gap (Panaretto et al., 2013; Gardner et al., 2011; Bailie, Matthews, Brands, & Schierhout, 2013). This paper goes a step further from traditional QI to link policy to comprehensive health service evaluation using a logic model that examines the system from all aspects; from policy, through to inputs, outputs and outcomes including clinical, health behavioural risk factors and population health. The use of a logic model analysis defines conceptually the links between inputs, preceding the outputs and the desired outcomes and includes the complex and interactive contextual relationships that are important in complex adaptive systems. The evaluation logic model describes how the actions might produce the immediate outcome of interest (Julnes & Rog, 2009) and is being increasingly used for case study evaluations (Yin, 2000) and in studying theories of change (Mulroy & Lauber, 2004). A companion paper (Reeve, Humphreys, Wakerman, Carter, et al., 2015) demonstrates that the application of this comprehensive systems approach has enabled the generation of primary health care systems performance data and provided empirical evidence of improvements, not only in quality of care indicators but also improvements in health outcomes as called for and described elegantly by Bailie et al. (2013).

This framework was developed because of the need for a rigorous, integrated health service evaluation tool able to link primary health care data collection with current hospital service data collection and connect them to national health performance indicators and national policy.

This paper describes the development of a comprehensive evaluation framework which takes into account the distinctive demographics and health needs of a population living in a remote area during the integration of the hospital and community based health services. The objective of this paper is to describe an evaluation and monitoring framework that enables changes in the model of service delivery to be tracked through changes in process indicators and the resultant health outcomes for the population.

Using the key principles of primary health care evaluation, it describes how relevant sentinel indicators were developed and corroborated in a remote community in north-west Western Australia.

2. Setting

The Fitzroy Valley is located in the Kimberley region of Western Australia and covers an area of around 30 000 km². There are 44 Aboriginal communities with a population of approximately 3500 people. Fitzroy Crossing is the largest community with a population of approximately 1500, 69% of whom identify as Aboriginal (Morphy, 2010). Services are provided to both Aboriginal (80%) and non-Aboriginal residents. The regional hospital is located in Broome 396 km away, while the tertiary referral hospital is in Perth 2567 km away making it one of the most remote and isolated regions in Australia (see Fig. 1).

Health services are provided by a formal partnership between Fitzroy Valley Health Service (both hospital and community services) and Nindilingarri Cultural Health Services (Reeve, Humphreys, Wakerman, Carroll, et al., 2015) have provided a detailed description of this health service model. The partnership model enables the provision of comprehensive primary health care, from health promotion and environmental health services provided by Nindilingarri Culture Health Services through to hospital inpatient and visiting specialists' services at the Fitzroy Valley Hospital. The physical hub for these health services is located in Fitzroy Crossing, where all health service partners are co-located, with outreach provided to outlying communities.

3. Methods

Mixed methods were used for the development of the framework. First, relevant literature around primary health care

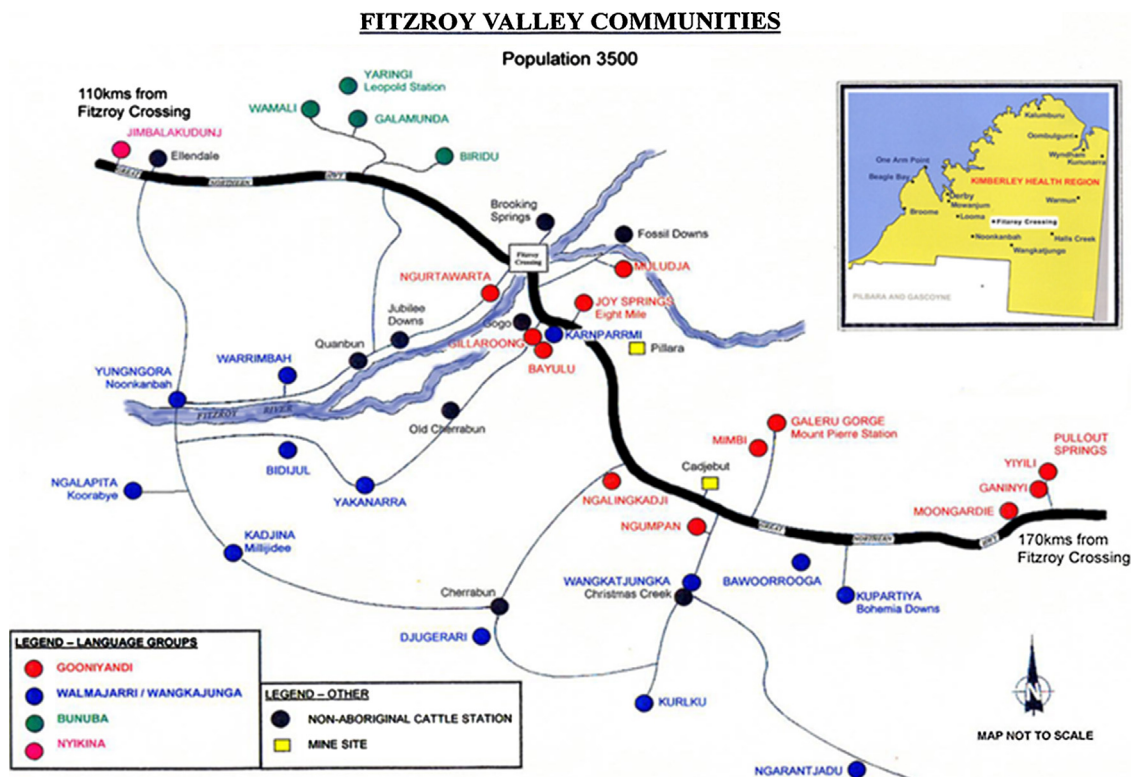


Fig. 1. Fitzroy valley communities.

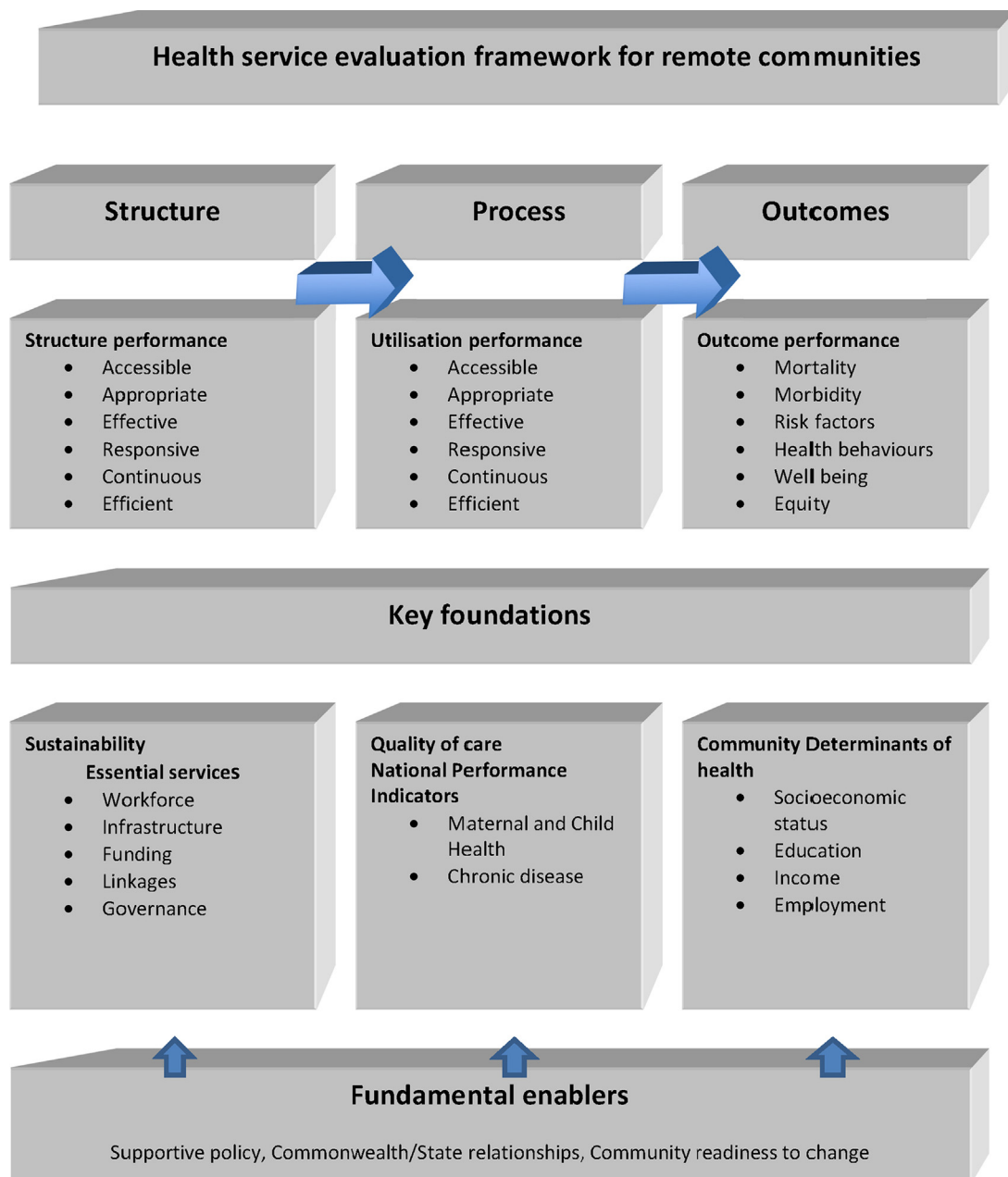


Fig. 2. Health service evaluation framework.

models in small remote and rural areas and community-controlled health services were reviewed including a targeted literature review of primary health service evaluation frameworks in Australia and overseas. This included both keyword searching using electronic databases and 'snowballing' based on the sentinel papers that emerged (including both peer-reviewed literature and 'grey' literature such as government reports and health service documents). Based on this review of the literature the research team developed and drafted a conceptual framework against which the change process and sustainability could be analysed.

Second, local information was collected through in-depth interviews conducted with key stake-holders and focus groups. Data were grouped thematically and to provide research rigour, the transcripts were independently analysed by two investigators, anomalies were discussed and resolved. Quantitative data (health service utilisation, workforce numbers and composition and health service availability) were also collected from the health services,

using annual reports and the report functions in the electronic medical record. Five stake-holder interviews and four focus groups (one in Broome and three in Fitzroy Crossing) were completed. Focus groups comprised health service providers (ten people), health governing council (14 people) and community members associated with the development of the partnership (six people). The focus group and interview analysis identified several key themes as crucial to the success of the change process. The results of these two processes are described in previous publications (Carroll, Reeve, Humphreys, Wakerman, & Carter, 2015; Reeve, Humphreys, Wakerman, Carroll, et al., 2015).

Finally, the evaluation framework was presented and discussed at a series of workshops with key stakeholders, including health service providers, policymakers and community members for input and modification. The aim of these workshops was to provide a forum for feedback, agreement was reached through discussion and consensus achieved by the group around which indicators were relevant and workable based on their experience. There was

agreement that the framework met the reporting needs of the health service partnership and confirmed its utility as a tool for evaluating health service performance in the Fitzroy Valley taking into account the remote context.

Ethics approval was provided by the Kimberley Aboriginal Health Planning Forum Research Subcommittee, the Western Australian Indigenous Ethics Council and the Western Australian Country Health Service (WACHS) Ethics Committee.

4. Results

4.1. The framework

The key principles of primary health service evaluation were adopted from two seminal pieces of work—Donabedian's (1988) quality of care paradigm linking structure, process and outcomes using program evaluation theory and Starfield's (2005) identification of key features of quality primary health care to reduce disparities in health outcomes in vulnerable populations. The requirements underpinning performance assessment in primary health care developed by Sibthorpe (2004) using the Australian National Health Performance Framework (National Health Performance Authority, 2012) provided indicators appropriate for the Australian context. This approach combines the two key principles of health performance improvement; external accountability and internal quality improvement (Freeman, 2002). Given the paucity of literature on comprehensive primary health service evaluation in remote communities, the PHC service evaluation framework (the 'Elmore framework') developed by Tham et al. (2010) provided a basis for modification to a remote context. Tham et al. (2010) used work from the Canadian Institute for Health Information (2006) and the National Health Performance Committee in Australia to identify sentinel indicators for health service performance, sustainability and quality of care in rural areas.

The modified framework developed by the research team for the Fitzroy Valley used the same three domains but divided them into two tiers; service performance and essential requirements for sustainability and improved health outcomes based on work by Wakeman and Humphreys (2011). The inclusion of health outcomes and determinants of health illustrates their dependent relationships and influence on health system performance and reflect the National Health Performance Framework. In the modified framework, Fig. 2, essential requirements for health service sustainability need to be addressed before the health service can achieve its outcomes and these can be monitored by measuring the performance of the structure. In a similar way utilisation performance monitoring leads to improved outcomes but is dependent on the quality of care provided. Ultimately the health outcomes of the community are dependent on the socioeconomic determinants of health and the extent to which these can be addressed at a community level will determine the long term health outcomes. This requires the fundamental enablement of strong local community leadership and readiness for change empowered by supportive Commonwealth and State policy.

4.2. The Indicators

The national health performance indicators were developed in 2008 by the Australian Institute of Health and Welfare (AIHW, 2008) to develop performance indicators to cover the entire health and aged care system comprehensively. The development of these indicators was commissioned by the Council of Australian Governments and by the National Health and Hospitals Reform Commission in order to measure progress against the reform agenda. In the development of our framework we selected key

hospital, primary care and public health indicators which were the most relevant to our context and achievable based on current data sets. Due to the high proportion of Aboriginal people using the health services (80%) more detailed performance indicators were selected by including National Key Performance Indicators for Aboriginal and Torres Strait Islander primary health care (nKPIs) (Australian Institute of Health and Welfare, 2014). The nKPIs build on an extensive foundation of primary health care performance data and quality improvement methods across northern Australia; including the Australian Primary Care Collaboratives (Robinson, d'Abbs, Togni, & Bailie, 2003), the Audit and Best Practice for Chronic Disease program (Gardner, Dowden, Togni, & Bailie, 2010), the Northern Territory Aboriginal Health Key Performance Indicators project, (Northern Territory Department of Health: NT Aboriginal Health Key Performance Indicators, 2009), the Queensland Aboriginal and Islander Health Council Health Information System (Queensland Aboriginal and Islander Health Council, 2011), and the Healthy for Life program. These nKPIs focus on chronic disease risk factors, prevention and management, and maternal and child health with the objective of closing the gap in life expectancy between Aboriginal and Torres Strait Islander people and non-Indigenous Australians and halving the gap in child mortality by 2018.

The service performance indicators were divided into two tables in order to monitor the structural (Table 1) and process (Table 2) domains. A service performance outcome table (Table 3) was added to evaluate health outcomes, based on the National Health Performance Framework and indicators from Australia's Health (Australian Institute of Health and Welfare, 2010) to enable external benchmarking and consistency with other evaluation frameworks.

The sustainability indicators or essential service requirements remained largely unchanged from the Elmore framework, with some minor contextual modifications (Table 4). Quality indicators (Table 5) were expanded due to the largely Aboriginal population to align with the Northern Territory Key Performance Indicators (NTKPI) (Northern Territory Department of Health, 2009), the National Framework for Aboriginal and Torres Strait Islander life cycle (Department of Health and Aging, 2006) and National Indigenous Primary Health Care Key Performance Indicators (IPHCKPI) (Australian Institute of Health and Welfare, 2014).

The five tables comprising the modified framework are described below while the indicators for the sixth component Determinants of Health use routinely collected national data and are listed in Fig. 2.

The key components of accessibility, appropriateness, effectiveness, responsiveness, continuity and efficiency are consistent with international health service quality indicators and national health performance indicators but have been separated into structural and process components. These structural components of health service performance contain the indicators required to ensure the health service structure facilitates optimal health service utilisation required to achieve the desired health outcomes. Key changes when compared with the Elmore framework include combining after hours and emergency access, as the hospital emergency department is the sole after hours service provider; bulk billing, service location and repeat prescriptions do not apply to this context, where there is no private practice.

Table 2 was added to measure health service activity and utilisation and take into account inpatient and outpatient hospital services. It provides information about access, appropriateness and effectiveness of health service activity and reflects quality of care. Process data relating to health service usage and activity assist with service planning and provides key information for modifying service delivery in order to improve health outcomes for the

Table 1
Health service performance—structure domain.

Component	Reason for selection	Service description
Accessible	Geographic proximity to enable access of emergency and primary care health services for remote communities	Availability of community health care clinics and emergency services in communities by location of health services and hours they are staffed
Appropriate	Core primary health care service availability through targeted programs based upon burden of disease and community needs	Description of dedicated programs matched to community burden of disease needs including Preventive health screening Sexual health Antenatal program Child health program School health program Male health program Chronic disease program
Effective	Preventive health service availability	Number and location of primary health staff for health promotion and disease prevention programs
Responsive	Culturally acceptable respectful care that responds to community input and patient experience to promote community empowerment Patient satisfaction with services.	Proportion of Aboriginal staff Community engagement with health service decision making documented in formal minutes Patient feedback on their health care experience by survey and complaints systems
Continuous	Provision of co-ordinated care across life stages Integrated multidisciplinary care with other providers	Proportion of all providers using the single shared electronic medical record Number of chronic disease and team care plans Recall system usage and proportion of recall appointments attended
Efficient	Cost effective use of resources to achieve desired results	Description of electronic medical records usage Total incentive payments for preventive care achieved per year Number of successful health service activity claims per year

community. This enables routinely collected occasions of service data to be used in a quality improvement cycle as part of annual strategic planning and service evaluation.

Table 2 data highlight the importance of structure in achieving process indicators and provides the linkage leading to improved health outcomes. It includes expanded health service activity as the Elmore framework did not contain hospital activity. The key indicators for appropriateness and effectiveness have been

adapted to match the demographics of the population and the availability of routinely collected data. They are based on the NTKPIs and the IPHCKPIs.

Table 3 monitors health outcomes to guide service provision and planning for improvement and better community health outcomes. The indicators were derived from the National Health Performance Framework to facilitate external benchmarking and comparisons with other locations.

Table 2
Annual health service activity performance—process domain.

Component	Reason for selection	Indicator
Accessible	To demonstrate accessibility to health care for emergency, admitted hospital care and primary health care	Number of emergency department visits per year Number of hospital separations per year Number of visits to outpatients and primary care per year Number of visits to allied health services per year Number of visits to community clinics per year
Appropriate	Comprehensive primary health care that is appropriate to health needs of the community	Number of health professional visits to communities per year Number of attendances to primary health programs per year Number of health checks per year Number of antenatal clinic attendances per year Annual child health screening coverage (%) Annual school health screening coverage (%)
Effective	Service reach of primary care and prevention Improved primary health care services to decrease avoidable mortality Decrease avoidable use of acute services	Number of individuals seen at least once the preceding 12 months Number of male occasions of service per year Proportion of primary care activity (primary care attendances/total number of occasions of service per year) Vaccination coverage (%) Number of preventable hospitalisations by category (acute, vaccine related and chronic condition admissions) Average length of hospital stay (in days) Number of unplanned readmissions to hospital within 28 days of last separation
Responsive	To provide respectful care and respond to patient experience and promote community empowerment	Number of acute emergency transfers to another centre per year Proportion of Indigenous community attendances (% of total attendances) Attendance at routine booked appointments (%)
Continuous	Provision of co-ordinated care across life stages	Number of chronic disease care plans for each calendar year Number of team care arrangements (TCA) per year Number of follow up appointments and recall appointments attended each year
Efficient	Cost effective use of resources to achieve desired results Proportion of funding used for primary health care services	Cost/per occasion of service for Hospital separation Emergency visits Outpatient visits Community health visits

Table 3

Annual health service activity performance—outcome domain.

Component	Reason for selection	Indicator
Mortality	Mortality rates are key health outcome measures	Annual mortality rate for population
Morbidity	Burden of disease as prevalence or incidence of disease per year are another key performance measure and essential for service delivery planning	Incidence of selected cancers by year Prevalence of type 2 diabetes in adults over 15 years Prevalence of end-stage kidney disease in adults over 15 years Prevalence of cardiovascular disease in adults over 15 years Prevalence of chronic obstructive airway disease in adults over 15 years
Risk factors	These are calculated using the patient diagnostic categories in the electronic medical record Bio-medical risk factors for disease, early identification and management improves health outcomes, reduces health inequalities and need for health care Health outcome indicator but heavily influence by socioeconomic and other health determinants	BMI data for those over 15 years Smoking and alcohol use for those over 15 yea
Health behaviours	Health behaviours that impact upon health outcomes	Proportion of community residents who are regular clients (have visited the health service 3 or more times in the preceding 12 months) Cervical screening coverage (% women aged 20–69 years) Annual birth rate for women aged < 20 years Breast screening coverage (% women aged 50–69 years)
Well being	Holistic health outcome reflecting self assessment of well being not just the absence of illness. National data collection using current national self reported survey (the Kessler Psychological Distress Scale (K10) for those aged 18 years and over Proportion of people aged > 18 years selecting a scale from low to very high for psychological distress and control over life. http://www.abs.gov.au/ausstats/abs@.nsf/Lookup/4364.0.55.003Chapter1102011-2012	Low, moderate, high or very high psychological distress National data collection using current national self reported survey (the Kessler Psychological Distress Scale (K10) for those aged 18 years and over. Proportion of people aged > 18 years selecting a scale from low to very high for psychological distress Self reported levels of control National data collection using current national self-reported survey for those aged 18 years and over. Proportion of people aged > 18 years selecting Strongly agreed or agreed with the statement that they had control over decisions that affect their life (internal locus of control). https://www.health.qld.gov.au/epidemiology/documents/srhs11-mh.pdf Self assessed health—poor, fair, good, very good or excellent. http://www.abs.gov.au/AUSSTATS/abs@.nsf/Lookup/4102.0Main+Features30Mar+2010 Self reported health conditions selected from list provided in national survey
Equity	Benchmarking against national indicators as an indication of equity	Comparative Indigenous Primary Health Care Key Performance Indicators (IPHCKPI)—Fitzroy Valley compare to WA and national indicators

The modified framework reflects the importance of essential service requirements to ensure the sustainability required for good health service performance. Service sustainability indicators are largely consistent with the Elmore framework, with additional emphasis on health workforce sustainability due to its vital role in remote areas. The key indicators of staff profile, vocational registration and retention measures were retained.

The indicators relating to linkages were also less applicable as there is largely a single service provider using integrated medical

records to which visiting services have access. Availability of IT services and even basic internet connection is still a critical issue which is being resolved. The proportion of funding from various streams is included, but as a government funded service with no private co-payments, indicators were modified accordingly. Governance, management and leadership categories remained unchanged from the Elmore framework.

The Elmore service quality indicators were expanded to include chronic disease and antenatal care indicators due to their

Table 4

Essential Requirements for sustainability—structural domain.

Component	Reason for selection	Indicators and service requirements
Workforce—appropriate	Demonstrate that workforce is adequate in volume and appropriate in distribution	Staff profile matches community needs Vocational registration type
Workforce—sustainability	Staff retention per year Staff stability per year	Percentage of staff retained in a financial year Mean length of service expressed in months Returning locum and agency staff numbers
Linkages	Co-ordination of care across providers	Documents—Memorandum of understanding
Referral pathways	Specialist access	Number of health providers using integrated electronic record per year Number of referrals per year Number of telehealth consultations per year Number of specialist consultations per year
Infrastructure	Infrastructure and ICT need to be adequate for needs and appropriate to function Ability to share electronic data to promote co-ordination of ongoing care Sufficient staff housing	IT—internet access by location and connection speed Description of ICT integration across systems and providers Number of unfilled vacancies due to staff accommodation shortage by year
Funding	Funding needs to be appropriate, sustainable and adequate for community needs Incentive programs to support primary health care and targeted programs in remote areas	Proportion of primary care funding (primary care/total) Number of medicare billing items per year
Governance, management and leadership	Demonstrate commitment to appropriate health care, adaptability and implementation of change in response to needs	Formal Partnership agreement Description of governance structure Number of meetings per year

Table 5

Annual quality of care—process domain.

Component	Reason for selection	Indicator
Antenatal care	Importance in long term health outcome National Indigenous Primary Health care Indicators	Number of 1st trimester antenatal visit before 12 weeks Number and proportion of antenatal visits before 20 weeks Number of premature deliveries (24–36 wk) Number of birth weight result <2500 g Number of birth weight result >4000 g
Diabetes (type 2) in people aged greater than 15 years	Best practice care indicators for improved outcomes ACR—albumin creatinine ratio in urine test ACE—angiotensin converting enzyme ARB—angiotensin receptor blocker	Number of patients with type 2 diabetes identified Proportion of eligible patients with a chronic disease care plan Number and proportion of type 2 diabetics with HbA1c measured in the last 6 months Number and proportion of type 2 diabetics with HbA1c ≤ 7 achieved in the last 6 months Number and proportion of type 2 diabetics with HbA1c ≤ 8 achieved in the last 6 months Number and proportion of type 2 diabetics with BP $\leq 130/80$ achieved in the last 6 months Number and proportion of type 2 diabetics with ACR measured in the past 12 months Number and proportion of type 2 diabetics on ACE or ARB Number and proportion of diabetes annual cycle of care completed per year
Renal disease—end stage kidney disease	Best practice care indicators for improved outcomes	Number of patients on renal register Number of patients with blood pressure $\leq 130/80$ Number and proportion of patients with renal disease with eGFR measured in the last year
Cardiovascular disease	Best practice care indicators for improved outcomes for patients diagnosed with any type of cardiovascular disease	Number and proportion of patients with renal disease on an ACE or ARB Number and proportion of patients diagnosed with renal disease on register Number and proportion of renal patients with care plan Number and proportion of patients with BP $\leq 130/80$ Number and proportion of patients with Cholesterol ≤ 4 Number and proportion of patients on ACE or ARB
Chronic obstructive pulmonary disease	Best practice care indicators for improved outcomes for patients diagnosed with any type of chronic obstructive pulmonary disease	Number and proportion of patients who do not smoke Number of patients on register by year Number and proportion of patients who do not smoke Number and proportion of patients who are Ex smokers Number and proportion of patients who have had spirometry in the last year

importance in the remote context. Seminal indicators for quality Aboriginal primary health are based on the NTAHKPIs and are consistent with the new National Indigenous Primary Health Care Key Performance Indicators (Australian Institute of Health and Welfare, 2014).

These quality indicators are foundational to achieving service performance and monitoring is essential to guide health service delivery and planning as a continuous quality improvement tool to drive health service improvement and better community health outcomes.

The socio-economic determinants of health are pivotal due to their direct and indirect impacts on health outcomes and their role in health inequity. The indicators have been taken from the National Health Performance Framework to reflect how the community level socioeconomic determinants affect individual health behaviour and wellbeing. The importance and impact of the determinants of health are so marked they can largely overshadow the efforts made by the health service and therefore must be addressed at a community and national level to improve health outcomes. The health service does not collect these data, so routinely collected ABS and Health Department data were selected.

5. Discussion

In a context of financial constraints and high burden of disease it is essential to maximise resources and the potential of health services to meet the needs of the community in a sustainable manner. There are no other comprehensive evaluation frameworks combining hospital services with primary health care services that we are aware of and this framework meets the need for an integrated framework that is fit for purpose using currently collected data linked to national indicators. It also highlights the

interrelated nature of primary health care and hospital services and their impact on each other.

The key primary health care evaluation principles are applicable to other contexts and the indicators can be successfully modified for purpose, based on the demographics and health needs of the population using local tacit knowledge and expertise to ensure flexibility and adaption to the context. The modification of the Elmore framework to a remote Aboriginal community provides an appropriate framework for evaluating health service performance, particularly in the many remote areas where small district hospitals and primary health care services are the sole providers. This enables comprehensive information to be fed back to health providers and the community as part of regular planning cycles. Many health services are based on historical service provision focused on acute episodic care. An integrated evaluation framework enables health services to make informed decisions to modify service provision in response to community needs in order to improve health outcomes for their communities.

We encourage further research to test this framework in other situations to add to the limited body of knowledge and understanding about contextualised, effective, sustainable primary health care services and their impact on community health outcomes.

Acknowledgements

This study was made possible through funding provided by a Western Australia State Health Research Advisory Council (SHRAC) Grant.

The research reported in this paper is a project of the Australian Primary Health Care Research Institute, which is supported by a grant from the Commonwealth of Australia as represented by the Department of Health and Ageing. The information and opinions

contained in it do not necessarily reflect the views or policy of the Australian Primary Health Care Research Institute or the Commonwealth of Australia.

References

- Australian Bureau of Statistics (ABS) (2013a). *Estimates of Aboriginal and Torres Strait Islander Australians*, June 2011. In *ABS cat. no. 3238.0.55.001*. Canberra: ABS (<http://www.abs.gov.au/AUSSTATS/abs@.nsf/Lookup/3238.0.55.001Main+Features1June%202011?OpenDocument>) (viewed 30 January 2014).
- Australian Bureau of Statistics (ABS) (2013b). *Life tables for Aboriginal and Torres Strait Islander Australians, 2010–2012*. In *ABS cat. no. 3302.0.55.003*. Canberra: ABS.
- Australian Institute of Health and Welfare (2008). *A set of performance indicators across the health and aged care system*. Canberra: AIHW (http://www.aihw.gov.au/indicators/performance_indicators_200806_draft.pdf) (accessed April 2015).
- Australian Institute of Health and Welfare (2010). *Australia's health 2010. Whose health? How population groups vary* In *Australia's health no. 12. Cat. no. AUS 122*. Canberra: AIHW.
- Australian Institute of Health and Welfare (2012). *Australia's health 2012*. In *Cat. no. AUS 156*. Canberra: AIHW.
- Australian Institute of Health and Welfare (2014). *National Key Performance Indicators for Aboriginal and Torres Strait Islander primary health care: First national results June 2012 to June 2013. National key performance indicators for Aboriginal and Torres Strait Islander primary health care series*. In *IHW 123*. Canberra: AIHW.
- Baillie, R. S., Si, D., O'Donoghue, L., & Dowden, M. (2007). *Indigenous health: Effective and sustainable health services through continuous quality improvement*. *Medical Journal of Australia*, 186(10), 525–527.
- Baillie, R., Matthews, V., Brands, J., & Schierhout, G. (2013). *A systems-based partnership learning model for strengthening primary healthcare*. *Implement Science*, 8, 143.
- Canadian Institute for Health Information (2006). *Pan-Canadian primary health care indicators, report 1, volume 2*. Ottawa: Canadian Institute for Health Information.
- Carroll, V., Reeve, C. A., Humphreys, J. S., Wakerman, J., & Carter, M. (2015). *Re-orienting a remote acute care model towards a primary health care approach: Key enablers*. *Rural and Remote Health*, 15, 2942.
- Department of Health and Aging (2006). *Aboriginal and Torres Strait Islander Health Performance Framework 2006 report*. Available at ([http://www.health.gov.au/internet/main/publishing.nsf/content/E1C132BA79E38973CA2578CB001C217D/\\$File/2006measures.pdf](http://www.health.gov.au/internet/main/publishing.nsf/content/E1C132BA79E38973CA2578CB001C217D/$File/2006measures.pdf)) [cited 22 June 2013].
- Donabedian, A. (1988). *The quality of care. How can it be assessed?* *JAMA*, 260(12), 1743–1748.
- Freeman, T. (2002). *Using performance indicators to improve health care quality in the public sector: A review of the literature*. *Health Services Management Research*, 15, 126–137.
- Gardner, K. L., Dowden, M., Togni, S., & Baillie, R. (2010). *Understanding uptake of continuous quality improvement in Indigenous primary health care: Lessons from a multi-site case study of the audit and best practice for chronic disease project*. *Implementation Science*, 5(21).
- Gardner, K., Baillie, R., Si, D., O'Donoghue, L., Kennedy, C., Liddle, H., et al. (2011). *Reorienting primary health care for addressing chronic conditions in remote Australia and the South Pacific: Review of evidence and lessons from an innovative quality improvement process*. *Australian Journal of Rural Health*, 19(3), 111–117.
- Julnes, G., & Rog, D. (2009). *Evaluation methods for producing actionable evidence: Contextual influences on adequacy and appropriateness of method choice*. In S. I. Donaldson, C. A. Christie, & M. M. Marks (Eds.), *What counts as credible evidence in applied research and evaluation practice?* (pp. 102–103). Sage Publications.
- Morphy, F. (2010). *Population, people and place: The Fitzroy Valley Population Project CAEPR working paper no. 70* Available at (<http://caepr.anu.edu.au/sites/default/files/Publications/WP/CAEPRWP70.pdf>) [cited 22 June 2013].
- Mulroy, E. A., & Lauber, H. (2004). *A user-friendly approach to program evaluation and effective community interventions for families at risk of homelessness*. *Social Work*, 49(4), 573–586.
- National Health Performance Authority (2012). *Performance and accountability framework*. Canberra: NHPA.
- Northern Territory Department of Health (2009). *NT Aboriginal Health Key Performance Indicators*. Available at (http://www.nt.gov.au/health/ahkpi/Reports/KPIDefinitionV1_3_3.pdf) [cited 4 November 2014].
- Panaretto, K. S., Gardner, K. L., Button, S., Carson, A., Schibasaki, R., Wason, G., et al. (2013). *Prevention and management of chronic disease in Aboriginal and Islander Community Controlled Health Services in Queensland: A quality improvement study assessing change in selected clinical performance indicators over time in a cohort of services*. *BMJ Open*, 3(4), e002083.
- Queensland Aboriginal and Islander Health Council (2011). *QAIHC closing the gap collaborative. In Quality improvement in primary health care services for Aboriginal and Torres Strait Islander people in Queensland*. Brisbane, QLD, Australia: QAIHC.
- Reeve, C., Humphreys, J., Wakerman, J., Carroll, V., Carter, M., O'Brien, T., et al. (2015). *Community participation in health service reform: The development of an innovative remote Aboriginal primary health-care service*. *Australian Journal of Primary Health*. <http://dx.doi.org/10.1071/PY14073>
- Reeve, C., Humphreys, J., Wakerman, J., Carter, M., Carroll, V., & Reeve, D. (2015). *Strengthening primary health care: Achieving health gains in a remote region of Australia*. *The Medical Journal of Australia*, 202(9), 483–487.
- Robinson, G., d'Abbs, P., Togni, S., & Baillie, R. (2003). *Aboriginal participation in health service delivery: Coordinated care trials in the Northern Territory of Australia*. *International Journal of Healthcare Technology and Management*, 5(1), 45–62.
- Rowley, K. G., O'Dea, K., Anderson, I., et al. (2008). *Lower than expected morbidity and mortality for an Australian Aboriginal population: 10-year follow-up in a decentralised community*. *Medical Journal of Australia*, 188(5), 283–287.
- Sibthorpe, B. (2004). *A proposed conceptual framework for performance assessment in primary health care: A tool for policy and practice*. Canberra: Australian Primary Health Care Research Institute, Australian National University.
- Starfield, B., Shi, L., & Macinko, J. (2005). *Contribution of primary care to health systems and health*. *Milbank Quarterly*, 83(3), 457–502.
- Tham, R., Humphreys, J., Kinsman, L., Buykx, P., Asaid, A., Tuohey, K., et al. (2010). *Evaluating the impact of sustainable comprehensive primary health care on rural health*. *Australian Journal of Rural Health*, 18, 166–172.
- Wakerman, J., & Humphreys, J. (2011). *Sustainable primary health care services in rural and remote areas: Innovation and evidence*. *Australian Journal of Rural Health*, 19, 118–124.
- Yin, R. K. (2000). *Case study evaluations: A decade of progress?* In *Evaluation models* (pp. 185–193). Netherlands: Springer.

Carole Reeve works for the Centre for Remote Health in Alice Springs and has spent the past 10 years evaluation primary care and public health programs. She is a rural and remote general practitioner and public health physician.

John Humphreys is Emeritus Professor of Rural Health Research in the Faculty of Medicine, Nursing and Health Sciences at Monash University. John was educated at the University of Melbourne and Monash University, and has worked at several universities in Australia and overseas, including the Ohio State University, the University of London, James Cook University of North Queensland, the Swinburne University of Technology, the Australian National University, the University of New England, and La Trobe University.

Professor John Wakerman is the Inaugural Director of the Centre for Remote Health, a Joint Centre of Flinders University and Charles Darwin University, in Alice Springs. He is a Public Health Medicine specialist and general practitioner, with a long background in remote primary health care services as a medical practitioner, senior manager, researcher and active advocate for rural and remote health issues. He has specific academic interests in remote health services research and health management education.